In the claims:

Please cancel claims 1-99. Please add new claims 300 to 427 as indicated below.

1-99 (cancel)

100-299 (withdrawn) Cancelled

300. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more target sequences for diversity generation and one or more diverse sequences;

(b) an array;

(c) an automated liquid handler operably coupled to (a) and (b) for dispensing nucleic acids into the array;

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(d) a thermocycler operably coupled to the array for generating one or more diverse nucleic acids;

(e) a product production module for automatically generating polypeptide product from the one or more diverse nucleic acids;

(f) a product purification module operably coupled to (e) for purifying the polypeptide product from the product production module, either partially or substantially to homogeneity; and

(g) a detector for identifying polypeptide product having a desired property.

301. (new) The system of claim 300, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

302. (new) The system of claim 300, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

303. (new) The system of claim 300, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

304 (new) The system of claim 302, wherein the automated fragmentation module utilizes a reagent selected from the group consisting of a nuclease, a polymerase, a random primer, a directed primer, a nucleic acid cleavage reagent, and a chemical nucleic acid chain terminator.

305. (new) The system of claim 302, further comprising a means for fragment purification.

306. (new) The system of claim 300, wherein the array is a liquid phase array.

307. (new) The system of claim 301, wherein the array is a liquid phase array.

308. (new) The system of claim 302, wherein the array is a liquid phase array.

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cont.

309. (new) The system of claim 300, further comprising a copy array.

310. (new) The system of claim 300, wherein the product production module conducts in vitro transcription and in vitro translation of the diverse nucleic acids to generate polypeptide product.

311. (new) The system of claim 300, wherein the array is a physical array.

312. (new) The system of claim 311, wherein the array is a microwell plate.

313. (new) The system of claim 300, wherein the array is a logical array.

314. (new) The system of claim 300,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

315. (new) The system of claim 301,

wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

316. (new) The system of claim 307,

wherein the computer contains data that correspond to one or more diverse sequences, and wherein the thermocycler generates one or more diverse nucleic acids corresponding to the data.

317. (new) The system of claim 300, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

318. (new) The system of claim 301, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

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cont'd

319. (new) The system of claim 302, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

320. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more target sequences for diversity generation and one or more diverse sequences;

(b) an array;

(c) an automated liquid handler operably coupled to (a) and (b) for dispensing nucleic acids into the array;

(d) an incubator operably coupled to the array for generating one or more diverse nucleic acids;

(e) a product production module for automatically generating polypeptide product from the one or more diverse nucleic acids;

(f) a product purification module operably coupled to (e) for purifying the polypeptide product from the product production module, either partially or substantially to homogeneity; and

(g) a detector for identifying polypeptide product having a desired property.

321. (new) The system of claim 320, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

322. (new) The system of claim 320, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

323. (new) The system of claim 320, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

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CON't.

324. (new) The system of claim 322, wherein the automated fragmentation module utilizes a reagent selected from the group consisting of a nuclease, a polymerase, a random primer, a directed primer, a nucleic acid cleavage reagent, and a chemical nucleic acid chain terminator.

325. (new) The system of claim 322, further comprising a means for fragment purification.

326. (new) The system of claim 320, wherein the array is a liquid phase array.

327. (new) The system of claim 321, wherein the array is a liquid phase array.

328. (new) The system of claim 322, wherein the array is a liquid phase array.

329. (new) The system of claim 320, further comprising a copy array.

330. (new) The system of claim 320, wherein the product production module conducts in vitro transcription and in vitro translation of the diverse nucleic acids to generate polypeptide product.

331. (new) The system of claim 320, wherein the array is a physical array.

332. (new) The system of claim 331, wherein the array is a microwell plate.

333. (new) The system of claim 320, wherein the array is a logical array.

334. (new) The system of claim 320,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

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335. (new) The system of claim 321,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

336. (new) The system of claim 327,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates diverse nucleic acids corresponding to the data.

337. (new) The system of claim 320, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

338. (new) The system of claim 321, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

339. (new) The system of claim 322, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

340. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more sequence targets for diversity generation and one or more diverse sequences;

(b) an array;

(c) an automated liquid handler operably coupled to (a) and (b) for dispensing nucleic acids into the array;

(d) a recombination/resynthesis module operably coupled to the array for generating one or more diverse nucleic acids;

(e) a product production module for automatically generating polypeptide product from the diverse nucleic acids;

(f) a product purification module operably coupled to (e) for purifying the polypeptide product from the product production module, either partially or substantially to homogeneity; and

(g) a detector for identifying polypeptide product having a desired property.

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cont.

341. (new) The system of claim 340, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

342. (new) The system of claim 340, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

343. (new) The system of claim 340, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

344. (new) The system of claim 342, wherein the automated fragmentation module utilizes a reagent selected from the group consisting of a nuclease, a polymerase, a random primer, a directed primer, a nucleic acid cleavage reagent, and a chemical nucleic acid chain terminator.

345. (new) The system of claim 342, further comprising a means for fragment purification.

346. (new) The system of claim 340, wherein the array is a liquid phase array.

347. (new) The system of claim 341, wherein the array is a liquid phase array.

348. (new) The system of claim 342, wherein the array is a liquid phase array.

349. (new) The system of claim 340, further comprising a copy array.

350. (new) The system of claim 340, wherein the product production module conducts in vitro transcription and in vitro translation of the diverse nucleic acids to generate polypeptide product.

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CON'T

351. (new) The system of claim 340, wherein the array is a physical array.

352. (new) The system of claim 351, wherein the array is a microwell plate.

353. (new) The system of claim 340, wherein the array is a logical array.

354. (new) The system of claim 340,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

355. (new) The system of claim 341,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

356. (new) The system of claim 347,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

357. (new) The system of claim 340, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

358. (new) The system of claim 341, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

359. (new) The system of claim 342, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

360. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more target sequences for diversity generation and one or more diverse sequences;

(b) an array;

(c) a means for dispensing nucleic acids into the array that is operably coupled to (a);

(d) a means for automatically generating one or more diverse nucleic acids from the nucleic acids in the array;

(e) a means for generating polypeptide product from the diverse nucleic acids that is operably coupled to (d);

(f) a means for purifying the polypeptide product, either partially or substantially to homogeneity, that is operably coupled to (e); and

(g) a means for identifying polypeptide product having a desired property that is operably coupled to (f).

361. (new) The system of claim 360, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

362. (new) The system of claim 360, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

363. (new) The system of claim 360, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

364. (new) The system of claim 362, wherein the automated fragmentation module utilizes a reagent selected from the group consisting of a nuclease, a polymerase, a random primer, a directed primer, a nucleic acid cleavage reagent, and a chemical nucleic acid chain terminator.

365. (new) The system of claim 362, further comprising a means for fragment purification.

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366. (new) The system of claim 360, wherein the array is a liquid phase array.

367. (new) The system of claim 361, wherein the array is a liquid phase array.

368. (new) The system of claim 362, wherein the array is a liquid phase array.

369. (new) The system of claim 360, further comprising a means for copying an array.

370. (new) The system of claim 360, further comprising a copy array.

371. (new) The system of claim 360, wherein the product production module conducts in vitro transcription and in vitro translation of the diverse nucleic acids to generate polypeptide product.

372. (new) The system of claim 360, wherein the array is a physical array.

373. (new) The system of claim 372, wherein the array is a microwell plate.

374. (new) The system of claim 360, wherein the array is a logical array.

375. (new) The system of claim 360,

wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

376. (new) The system of claim 361,

wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

377. (new) The system of claim 367,

wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

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378. (new) The system of claim 360, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

379. (new) The system of claim 361, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

380. (new) The system of claim 362, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

381. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more target sequences for diversity generation and one or more diverse sequences;

(b) an array;

(c) an automated liquid handler operably coupled to (a) and (b) for dispensing nucleic acids into the array;

(d) a thermocycler operably coupled to the array for generating one or more diverse nucleic acids in a liquid phase array;

(e) a product production module for automatically generating polypeptide product from the one or more diverse nucleic acids;

(f) a detector for identifying polypeptide product having a desired property.

382. (new) The system of claim 381, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

383. (new) The system of claim 382, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

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384. (new) The system of claim 380, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

385. (new) The system of claim 383, further comprising a means for fragment purification.

386. (new) The system of claim 381,
wherein the computer contains data that correspond to one or more diverse sequences, and
wherein the system generates one or more diverse nucleic acids corresponding to the data.

387. (new) The system of claim 382,
wherein the computer contains data that correspond to diverse sequences, and
wherein the system generates one or more diverse nucleic acids corresponding to the data.

388. (new) The system of claim 381, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

389. (new) The system of claim 382, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

390. (new) The system of claim 383, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

391. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more target sequences for diversity generation and one or more diverse sequences;

(b) an array;

(c) an automated liquid handler operably coupled to (a) and (b) for dispensing nucleic acids into the array;

(d) an incubator operably coupled to the array for generating one or more diverse nucleic acids in a liquid phase array;

(e) a product production module for automatically generating polypeptide product from the one or more diverse nucleic acids;

(f) a detector for identifying polypeptide product having a desired property.

392. (new) The system of claim 391, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

393. (new) The system of claim 391, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

394. (new) The system of claim 390, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

395. (new) The system of claim 393, further comprising a means for fragment purification.

396. (new) The system of claim 391,

wherein the system further comprises a computer containing data that correspond to diverse sequences, and

wherein the system generates one or more diverse nucleic acids corresponding to the data.

397. (new) The system of claim 392,

wherein the system further comprises a computer containing data that correspond to diverse sequences, and

wherein the system generates one or more diverse nucleic acids corresponding to the data.

398. (new) The system of claim 391, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

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399. (new) The system of claim 392, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

400. (new) The system of claim 393, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

401. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more target sequences for diversity generation and one or more diverse sequences;

(b) an array;

(c) an automated liquid handler operably coupled to (a) and (b) for dispensing nucleic acids into the array;

(d) a recombination/resynthesis module operably coupled to the array for generating one or more diverse nucleic acids in a liquid phase array;

(e) a product production module operably coupled to (d) for automatically generating polypeptide product from the one or more diverse nucleic acids;

(f) a detector for identifying polypeptide product having a desired property.

402. (new) The system of claim 401, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

403. (new) The system of claim 401, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

404. (new) The system of claim 401, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

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405. (new) The system of claim 403, further comprising a means for fragment purification.

406. (new) The system of claim 401,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

407. (new) The system of claim 402,
wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

408. (new) The system of claim 401, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

409. (new) The system of claim 402, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

410. (new) The system of claim 403, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

411. (new) A system for diversity generation, said system comprising:

(a) a computer containing data that corresponds to one or more sequences selected from the group consisting of one or more target sequences for diversity generation and one or more diverse sequences;

(b) an array;

(c) a means for dispensing nucleic acids into the array that is operably coupled to (a);

(d) a means for generating one or more diverse nucleic acids in a liquid phase array;

(e) a means for generating polypeptide product from the diverse nucleic acids that is operatively coupled to (d); and

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cont.

(f) a means for identifying polypeptide product having a desired property.

412. (new) The system of claim 411, further comprising an automated oligonucleotide synthesizer operably coupled to (c).

413. (new) The system of claim 411, further comprising an automated fragmentation module operably coupled to (c) for producing fragmented nucleic acids.

414. (new) The system of claim 413, further comprising a means for fragment purification.

415. (new) The system of claim 411, wherein the system generates one or more diverse nucleic acids by assembly of oligonucleotides.

416. (new) The system of claim 411,

wherein the computer contains data that correspond to one or more diverse sequences, and

wherein the system generates one or more diverse nucleic acids corresponding to the data.

417. (new) The system of claim 412,

wherein the computer contains data that correspond to one or more diverse sequences, and wherein the system generates one or more diverse nucleic acids corresponding to the data.

418. (new) The system of claim 411, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

419. (new) The system of claim 412, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

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420. (new) The system of claim 413, further comprising a second liquid handler for diluting the diverse nucleic acids in an array.

421. (new) The system of claim 300, further comprising a bar-code reader for sample tracking.

422. (new) The system of claim 320, further comprising a bar-code reader for sample tracking.

423. (new) The system of claim 340, further comprising a bar-code reader for sample tracking.

424. (new) The system of claim 360, further comprising a bar-code reader for sample tracking.

425. (new) The system of claim 381, further comprising a bar-code reader for sample tracking.

426. (new) The system of claim 401, further comprising a bar-code reader for sample tracking.

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427. (new) The system of claim 411, further comprising a bar-code reader for sample tracking.